# PATENT SPECIFICATION (11) 1 380 874

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(21) Application No. 34510/73 (22) Filed 19 July 1973
(31) Convention Application No. 2 235 729
(32) Filed 21 July 1972 in
(33) Germany (DT)
(44) Complete Specification published 15 Jan. 1975
(51) INT CL² B60K 11/02
(52) Index at acceptance B7H A26B A26E A2F



## (54) AN ARMOURED FIGHTING VEHICLE HAVING AN IMPROVED ENGINE COOLING SYSTEM


(71) We, DR.—ING. h.c.F PORSCHE AKTIENGESELLSCHAFT, of Porschestrasse 42, Stuttgart-Zuffenhausen, Germany, a German Company, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—


The invention relates to an armoured fighting vehicle having an engine cooling system.

The most reliable protection of an armoured vehicle against enemy gunfire consists in a silhouette which is as flat and low as possible. The size and shape of the silhouette is affected not least by the height of the compartment required to house the engine-transmission assembly as well as the engine ancillaries, in particular the engine cooling system.

In a known vehicle of this kind, the engine cooling system is situated behind the engine and above the transmission gear and consists of an axial flow fan driven by the transmission gear through an auxiliary drive, a cooling air duct extending transversely of the vehicle with radiators arranged in an upright position within the duct and close to the axial flow blower. The fresh air drawn in by the axial blower or fan through an appropriate intake opening in the roof of the amoured vehicle is deflected at right angles to the direction of induction and ducted through the cooling units. The need for a deflection of the cooling air, as well as the vertical positioning of the two radiators, result in a cooling air duct of large volume and high structure.

The object of the present invention is to provide an armoured vehicle having an engine cooling system of flat construction which ensures high cooling efficiency with minimum structural height and low power consumption.

The present invention consists in an armoured fighting vehicle having an engine cooling system comprising one or more radial flow fans mounted with the axis of the, or each, fan vertically disposed in a flat cooling air duct extending transversely of the longitudinal axis of the vehicle with each end of the duct terminating at an outlet grating formed in a sidewall of the vehicle and radiators positioned in said duct on opposite sides of said fan or fans.

Preferably, the, or each, radial flow fan is positioned in a centrally disposed bowl shaped portion of said duct and said radiators are mounted at a slight angle with respect to the horizontal in sections of the duct directed obliquely upwards. To obtain a high cooling efficiency in such a cooling system of this nature, it is advantageous to position a plurality of radial flow fans arranged side-by-side on the longitudinal axis of the vehicle.

In the accompanying drawings:—

Figure 1 is a diagrammatical plan view of a portion of an armoured fighting vehicle having an engine cooling system according to the present invention, and

Figure 2 is a cross-section taken through the line II—II of Figure 1.

As shown in Figures 1 and 2 an armoured hull 1 of a combat tank, accommodates an engine 2 and a transmission gear 3 positioned one behind the other in a separate compartment. Above the transmission gear 3, radial flow fans 5 and radiators 6 positioned on opposite sides of the fans 5 form the engine cooling system and are housed within a cooling air duct 4. A protective grating 7 and an air intake funnel 8 are positioned anterior to the intake side of the radial flow fans 5 which are arranged side-by-side on the longitudinal axis of the vehicle and driven direct by the transmission gear 3 through auxiliary drives.

The cooling air duct 4 comprises a centrally disposed bowl 9 receiving the radial flow fans 5 with passages 11 symmetrically arranged with respect to the duct 4. Each passage 11 includes a section

10 directed obliquely upwards which is connected through the passages 11 to cooling air outflow openings 13 formed in the armoured hull 1 and covered by outlet gratings 12 which are resistant to gunfire. In the sections 10 are positioned the radiators 6 mounted at a slight angle with respect to the horizontal so that they are substantially at right angles to the cooling air flow as denoted by the arrows 14.

Fresh air drawn in through the gratings 7 and the intake funnels 8 is impelled by the radial flow fans 5 into the bowl 9 of the cooling air duct 4, from which it is passed through the sections 10 and radiators 6 to the cooling air outlet openings 13 in the armoured hull. Due to the upwardly directed sections 10 which are adjacent to the bowl 9, the fresh air issuing from the radial flow fans does not impinge directly on the radiators 6 and thus, any entrained dirt drawn in with the cooling air cannot be flung directly onto the surface of the radiators 6 so that in the event of considerable contamination of the fresh air, clogging of the honeycombs of the surface radiators 6 with a consequent decrease in cooling efficiency is prevented.

WHAT WE CLAIM IS:—

1. An armoured fighting vehicle having an engine cooling system comprising one or more radial flow fans mounted with the axis of the, or each, fan vertically disposed in a flat cooling air duct extending transversely of the longitudinal axis of the vehicle with each end of the duct terminating at an outlet grating formed in a sidewall of the vehicle and radiators positioned in said duct on opposite sides of said fan or fans.

2. A vehicle according to claim 1, wherein the, or each, radial flow fan is positioned in a centrally disposed bowl shaped portion of said duct and said radiators are mounted at a slight angle with respect to the horizontal in sections of the duct directed obliquely upwards.

3. A vehicle as claimed in claim 1 or 2, wherein a plurality of radial flow fans are arranged side-by-side on the longitudinal axis of the vehicle.

4. An armoured fighting vehicle having an engine cooling system substantially as described with reference to the accompanying drawings.

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Printed for Her Majesty's Stationery Office by the Courier Press, Leamington Spa, 1975.
Published by the Patent Office, 25 Southampton Buildings, London, WC2A 1AY, from which copies may be obtained.

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1 SHEET *This drawing is a reproduction of the Original on a reduced scale*

Fig.1

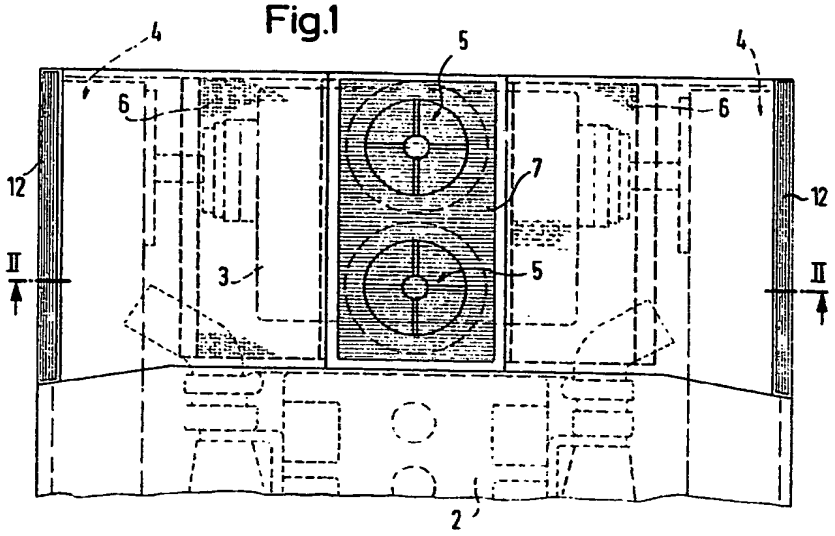
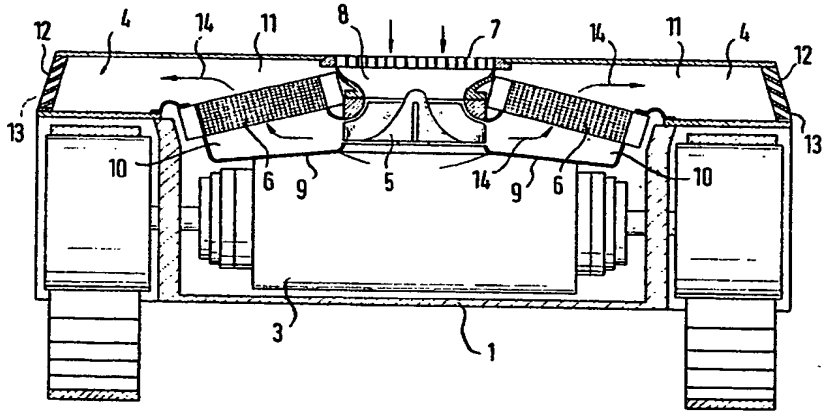



Fig.2



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